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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,641	08/19/2003	Weimin Li	M4065.0541/P541-A	3754
24998	7590	04/26/2004	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			GARCIA, JOANNIE A	
2101 L STREET NW			ART UNIT	
WASHINGTON, DC 20037-1526			PAPER NUMBER	
			2823	

DATE MAILED: 04/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

10/642,641

### Applicant(s)

LI, WEIMIN

### Examiner

Joannie A Garcia

### Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 65-90 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 82-90 is/are allowed.
- 6) ☒ Claim(s) 65-81 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0415.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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Claims 82-90 are objected to because of the following informalities: In claim 82, line 2, "A" before "bottom electrode" should be replaced with --a--. Appropriate correction is required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 65, 66, 69, 70, 75, 76, and 79, are rejected under 35 U.S.C. 102(a) as being anticipated by Zhu et al (U.S. Patent 6,495,412).

Zhu et al discloses a method for making an integrated circuit planar capacitor 180 comprising forming a bottom electrode 184 over a substrate 181 (Figure 20, Column 21, lines 56-61, and claim 1, line 3), forming a high-dielectric film 185 over said bottom electrode by a CVD process (Figure 20, Column 21, lines 56-61, Column 22, lines 5-8, and claim 1, line 4), wherein said high-dielectric film could be either BST, Ta<sub>2</sub>O<sub>5</sub>, or SrTiO<sub>3</sub>, among other materials (claim 2), annealing said high-dielectric film in a nitrogen atmosphere in a first annealing step at a temperature of 700 °C (Column 23, lines 5-11, Column 25, lines 1-7, Column 28, lines 29-32, and claim 1, lines 5-6), annealing said high-dielectric film in an oxygen atmosphere in a second annealing step at a temperature of 400 °C (Column 22, lines 23-26, and claim 1, lines 7-9), wherein a crystal growth in the directions <200>, and <001> would have been obtained because the same materials have been treated in the same way. Zhu et al discloses as well, formation of said bottom electrode 184 by using either platinum or ruthenium, among other materials (Column 20, lines 63-65, and Column 22, lines 1-3), and forming a titanium nitride diffusion

barrier 183 between said conductive plug and said bottom electrode 184 (Figure 20, Column 21, lines 56-61, and Column 22, lines 1-2). Zhu et al discloses as well, forming a bottom electrode 65 over an oxidizable conductive plug 62 (Figure 5H)

Claims 67, 68, 71-74, 77, 78, 80, and 81, are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu et al as applied to claims 65, 66, 69, 70, 75, 76, and 79, above, and further in view of Pan (U.S. Patent 5,858,832), Summerfelt et al (6,548,343), and the following comments.

Zhu et al discloses forming an integrated circuit planar capacitor 180, wherein the upper electrode 186 of said capacitor is formed by a sputtering process (Figure 20, and Column 22, lines 29-31). Zhu et al does not teach forming said upper electrode by a PVD process. Pan discloses forming an upper electrode 40b over substrate 30 using either a sputtering process, a PVD process, or a CVD process (Figure 2, and Column 4, lines 3-20). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Zhu et al and Pan to enable formation of upper electrode 186 in the integrated circuit planar capacitor 180 of Zhu et al to be performed according to the teachings of Pan.

Zhu et al discloses forming an oxidizable material 182 over substrate 181, forming a diffusion barrier 183 made of titanium nitride between said oxidizable material and said bottom electrode 184 (Figure 20, Column 21, lines 56-61, and Column 22, lines 1-2). Zhu et al does not that said diffusion barrier is made of tantalum nitride or tantalum silicon nitride. Summerfelt et al discloses employing as diffusion barrier, either titanium nitride, tantalum nitride, tantalum silicon nitride, among other materials (Column 8, lines 21-24). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Zhu et al and Summerfelt et

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al to enable formation of diffusion barrier 183 in the integrated circuit planar capacitor 180 of Zhu et al to be performed according to the teachings of Summerfelt et al.

With regard to claims 15, 16, 35, and 36, one of ordinary skill in the art would have been led to the recited thickness to achieve the desired density of the finished wafer of Zhu et al. (See MPEP 2144.05).

With regard to claims 22 and 23, one of ordinary skill in the art would have been led to the recited temperatures to achieve the desired time of the anneal in the process of Zhu et al. (See MPEP 2144.05).

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%).

Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it

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has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claims 82-90 are allowed.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956 until 2/4/04. See MPEP 203.08.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Joannie Adelle García whose telephone number is (571) 272-1861. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 872-9317. Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

  
JAG

January 9, 2004

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